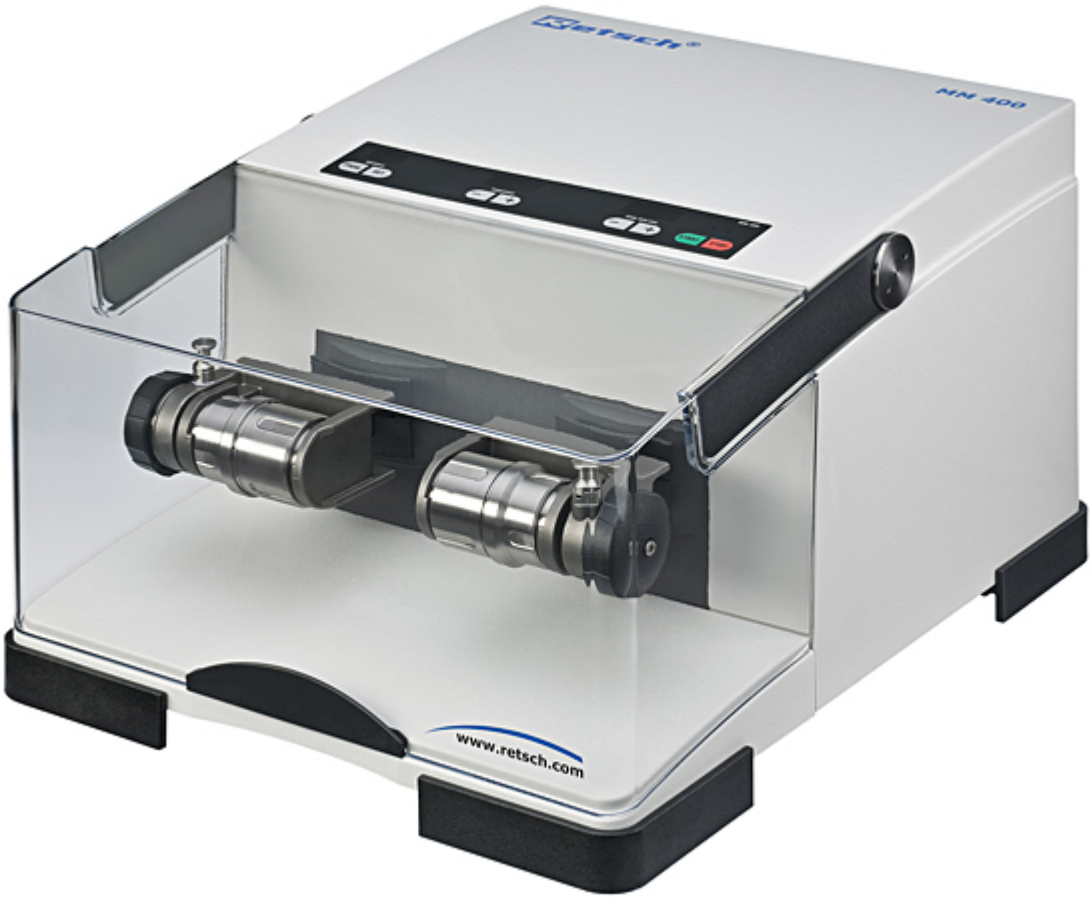

Operating Instructions for Oscillating Mill MM400

Retsch®

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Notes on these operating instructions

These operating instructions for the oscillating mill, type MM400, give all the necessary information on the areas mentioned in the contents.

They instruct the target group(s) for each of the defined areas, in order to ensure safe handling of the MM 400 when used for the intended purpose. Knowledge of the relevant section is an essential precondition for safe, proper use of the machine.

This technical documentation is a reference work and also a set of teaching instructions. The individual sections are complete in themselves.

These operating instructions do not include instructions for repairs. In case of possible defects or necessary repairs please contact your suppliers or Retsch GmbH direct:

Retsch GmbH, www.retsch.de/

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Safety

Target group: All persons concerned with the machine in any way

The MM 400 is a modern, highly efficient product of Retsch GmbH, corresponding to state of the art. If the machine is used according to the intended purpose with a knowledge of this technical documentation it is completely safe and reliable to operate.

Safety instructions

As the operating authority it is your duty to ensure that all persons charged with working on the MM 400:

- have read and understood all the instructions on safety,
- before beginning work know all the instructions and regulations for the target group relevant to their work,
- have access to the technical documentation for this machine at all times, without problems.
- New personnel should be familiarized with safe, proper handling of the machine before beginning work on the MM 400, either by verbal instruction from a competent person or through this technical documentation.
- Improper operation can cause injury to persons or damage to the equipment. You are responsible for your own safety and that of your employees.
- Ensure that no unauthorised persons have access to the MM 400.

For your own protection have your employees confirm that they have been instructed in operation of the MM 400. The draft of a suitable form is given at the end of the section on safety.

We exclude any claims for damages of any kind for injury to persons and damage to equipment arising from non-observance of the following safety instructions.

Warning signs

Warnings are given by the following signs:

Injury to persons

Damage to equipment

Observe instructions for use

Repairs

These operating instructions do not include repair instructions. For your own safety repairs must be carried out only by Retsch GmbH or an authorised agent (service technicians).

In this case please contact:

The Retsch agency in your country
Your supplier
Retsch GmbH directly

Your service address:

_____

_____

_____

_____

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Safety instructions

We exclude any liability for claims for damages in any form whatsoever for injury to persons or damage to the machine caused through non-observance of the following safety instructions.

Use according to the intended purpose

Do not make any alterations to the machine and use only spare parts and accessories approved by Retsch. Otherwise the Declaration of Conformity with European directives made by Retsch will lose its validity. Furthermore this will also lead to the loss of any guarantee claims.

Packing materials

Please keep the packing material for the duration of the guarantee period, since, in case of a complaint and return of the machine in unsuitable packing material your guarantee claim will be at risk.

Transport

The MM 400 must not be jolted, shaken or thrown during transport. Otherwise the electronic and mechanical components may be damaged.

Temperature variations

If subjected to high temperature variations (e.g. during transport by aircraft) the MM 400 must be protected against condensed water. Otherwise the electronic components may be damaged.

Supply schedule

If the delivery is incomplete and/or transport damage is found, you must inform the transporter and Retsch GmbH immediately (within 24 hrs). Later complaints may possibly be no longer considered.

Conditions for the place of installation

If the temperature drops below or exceeds the ambient temperature the electronic and mechanical components may be damaged; the performance data are then altered to an unknown extent.

At high atmospheric humidity the electronic and mechanical components may be damaged and the performance data are altered to an unknown extent.

Electrical connection

If the values on the rating plate are not observed the electrical and mechanical components may be damaged.

Inserting / replacing the milling cups

Ensure that the milling cups are inserted correctly in the milling cup holder – otherwise they can become damaged when starting the machine.
Both milling positions must always be used since otherwise this will cause considerable unbalance.

When removing and opening hot milling cups always wear protective gloves.
Danger of burning the hands.

General

Observe the relevant regulations and directives of your country for handling chemicals and hazardous materials.
Apply these when working with the MM 400.

Materials

Milling of materials with the MM 400 which give a risk of fire or explosion is prohibited.

Please take the necessary measures, depending on the hazardous nature of your sample, to prevent danger to persons.

Note also that the properties, and therefore the hazardous nature of your sample, can change during the milling process.

Safety instructions for handling liquid nitrogen

Always wear protective goggles and protective gloves when handling liquid nitrogen.

Liquid nitrogen has a temperature of –196°C and can cause frostbite or injury similar to burns if it comes into contact with the skin or eyes.

Follow the safety regulations of the cooling liquid supplier.
Retsch GmbH accepts no liability whatsoever arising from the use of liquid nitrogen or similar materials.

Cleaning

Do not clean the MM 400 under running water. Danger to life through current surge.
Use only a cloth moistened with water. Cleaning agents and solvents should not be used – not for cleaning the milling tools either.

Accessories for the MM 400

Do not make any alterations to the machine and use only spare parts and accessories approved by Retsch. Otherwise the Declaration of Conformity with European directives made by Retsch will lose its validity. Furthermore this will also lead to the loss of any guarantee claims.

Wearing parts

These operating instructions do not include any repair instructions. For your own safety repairs should be carried out only by Retsch GmbH or an authorised agent (service technicians).

Confirmation

I have taken note of the sections „Notes on these operating instructions" and "Safety"

_____

Signature of operating authority

_____

Signature of service technician

Technical data

Target group: Operating authority, operator
Machine type designation: MM 400

Use according to the intended purpose
The MM 400 is a laboratory machine and is suitable for milling and homogenising soft, fibrous, hard and brittle materials in the wet and dry state.

The MM 400 is designed for use with screw-type milling cups with a steel casing and a milling set with clamping centerings of dia. 36 mm and a min. clamping length of 60 mm. It is used for fast, super fine milling of 2 samples simultaneously. Ceramic milling cups without a complete steel casing must not be used.

The closed milling system guarantees complete recovery of the samples. Owing to the extremely short milling time and the high final fineness of the material to be milled the MM 400 is also ideally suitable for sample preparation for all spectral analyses.

Final finenesses of down to 1 µm can be achieved, depending on the milling time and the specific properties of the sample material. The optimum milling cup filling is as a rule 1/3 of the milling cup volume.

Exceptions to this are voluminous materials, such as wool, leaves, grasses and suchlike. In these cases a filling level of 70-80% is necessary.

	The sample quantity should not be less than 25% of the milling cup volume. **The milling ball/s may otherwise damage the milling cups.**
	The milling cup materials and milling ball materials must always be identical. **The milling ball/s may otherwise damage the milling cups.**
	Do not make any alterations to the machine and use only spare parts and accessories approved by Retsch. **Otherwise the Declaration of Conformity with the European directives by Retsch loses its validity.** **Futhermore this will result in the loss of any kind of guarantee claim.**
	Do not clamp any ceramic milling cups of the MM 2/200 or any milling cups without a complete steel casing. **Clamping by the metallic components of the milling cup holder of the MM 400 can cause damage to the ceramic parts.**

Do not use ceramic or natural stone milling cups for milling graphite or graphite mixtures.

The high lubricating properties of graphite cause high milling ball speeds, the energy of which cannot be absorbed by the material owing to its low density.

For this reason there is a danger that the ceramic or natural stone inserts of the milling cups will be destroyed by the ball/s.

For further information our application laboratory will be pleased to assist you.

Protective equipment

The milling chamber of the laboratory mill MM 400 is enclosed by a strong covering hood.

Starting the machine is possible only with the hood closed.

Emissions

Noise characteristic values :

The noise characteristic values are also influenced by the properties of the material to be milled.

Example 1:
Intensity of sound L_{WA} = 71.4 dB(A)

Emission value related to workplace L_{pAeq} = 61 dB(A)

Operating conditions:

Container:	2 steel milling cups of 25 ml
Milling organ:	1 steel ball 20 mm
Material charged:	Quartz crushed pebbles approx. 4.0 – 6.0 mm
Charged quantity:	8ml

Example 2:
Intensity of sound L_{WA} = 76 dB(A)

Emission value related to workplace L_{pAeq} = 65 dB(A)

Operating conditions:

Container:	2 steel milling cups of 5 ml
Milling organ:	2 tungsten carbide balls 8 mm
Material charged:	Quartz crushed pebbles approx. 1.0 – 1.5 mm
Charged quantity:	1.5ml

Protective systems
IP30

Rated power:

150 Watt

Machine dimensions

Height: 266 mm up to approx. 524 mm with hood opened
Width: 371 mm
Depth: 461 mm

Weight: approx. 26 kg without milling cups

Required floor space

400 mm x 500 mm; no safety distance required.

Transport and installation

Target group: operating authority, transporter, operators

Packing
Packing is adapted to the transport route and conforms to generally applicable packaging guidelines.

Please keep the packing material for the duration of the guarantee period since if there is a complaint and the machine is returned with inadequate packing your guarantee claim will be at risk.

Transport

The MM 400 must not be knocked, shaken or thrown during transport. Otherwise the electronic and mechanical components can become damaged.

Temperature variations

If temperature variations are high (e.g. during air transport) the MM 400 must be protected against condensed water. Otherwise the electronic components can become damaged.

Intermediate storage
Ensure that the MM 400 is also stored dry during intermediate storage.

Supply schedule

- MM 400
- 1 power supply cable
- 1 set of operating instructions

Check completeness of the delivery, including individually ordered accessories.

Check perfect functionability of the MM 400 (see also section on operation).

If the delivery is incomplete and / or there is transport damage you must inform the transporter and Retsch GmbH immediately (within 24 hrs). Later complaints may possibly be no longer considered.

Conditions for the place of installation

Ambient temperature:

5°C to 40°C

If the ambient temperature drops below or exceeds these values the electronic and mechanical components can become damaged and performance data are changed to an unknown extent.

Atmospheric humidity:

Maximum relative humidity 80% at temperatures up to 31°C,

decreasing linearly down to 50% relative humidity at 40°C.

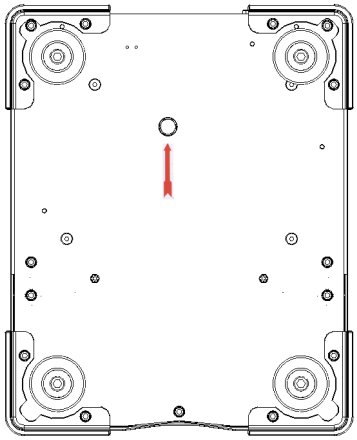
At higher atmospheric humidity the electronic and mechanical components can become damaged and performance data are changed to an unknown extent.

Installation height:

max. 2000 m above sea level

Installation

Mount the MM 400 on a firm, stable laboratory bench since otherwise vibrations can be transmitted.



Remove transport safeguard:

A transport safeguard, which is marked with an arrow, is located on the underside of the MM 400.

- Unscrew the screw and remove.
- Keep the transport safeguard device for transport at a later date.

Operation **with** the transport safeguard or transport **without** the transport safeguard can cause damage to the mechanical components.

Electrical connection

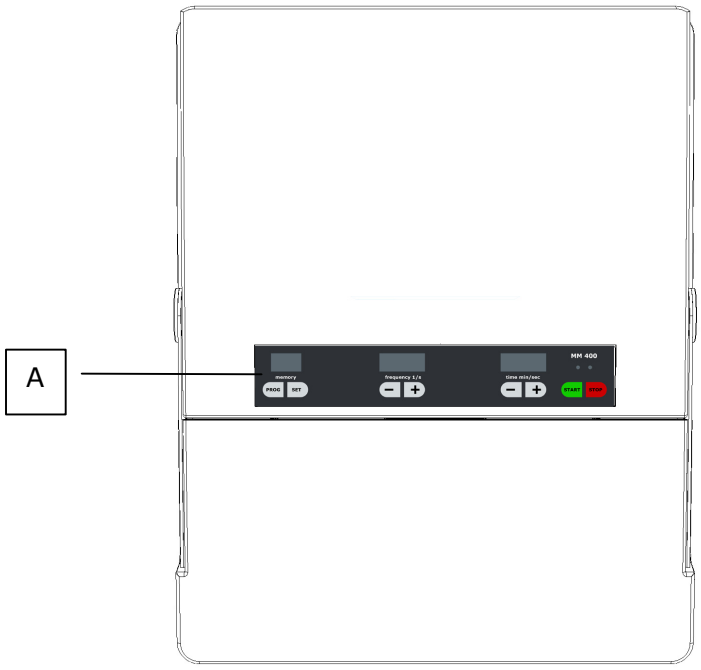
- The voltage and frequency for the MM 400 are given on the type plate.
- Ensure that these values correspond to the available power supply system.
- Connect the MM 400 to the power supply system using the supplied connection cable.
- Protection by external fusing is to be used when connecting the mains cable to the power supply, according to the regulations at the place of installation.

If the values on the type plate are not observed this can result in damage to the electrical and mechanical components.

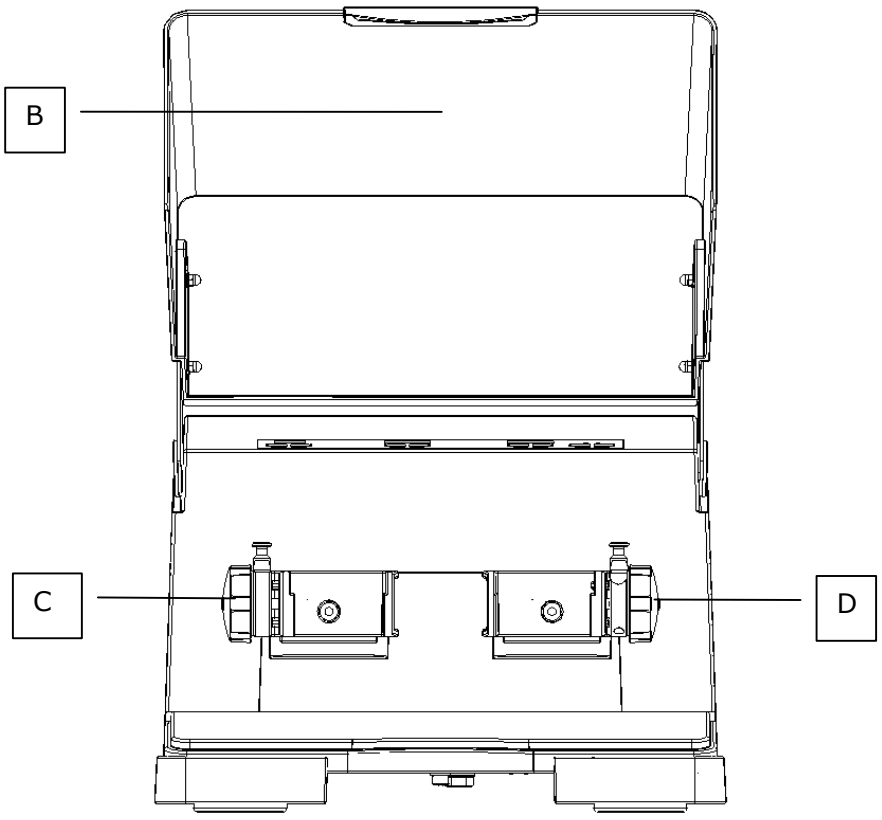
Operation

Target group: operators

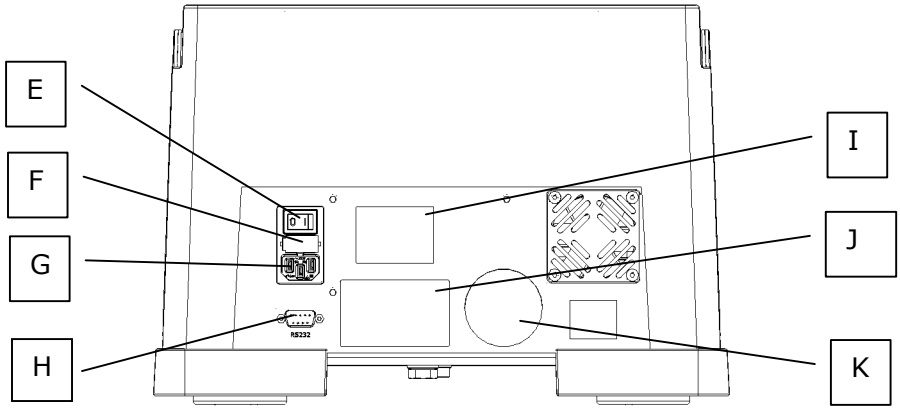
Operating elements and operation
Graphical representation



Plan view



Front view

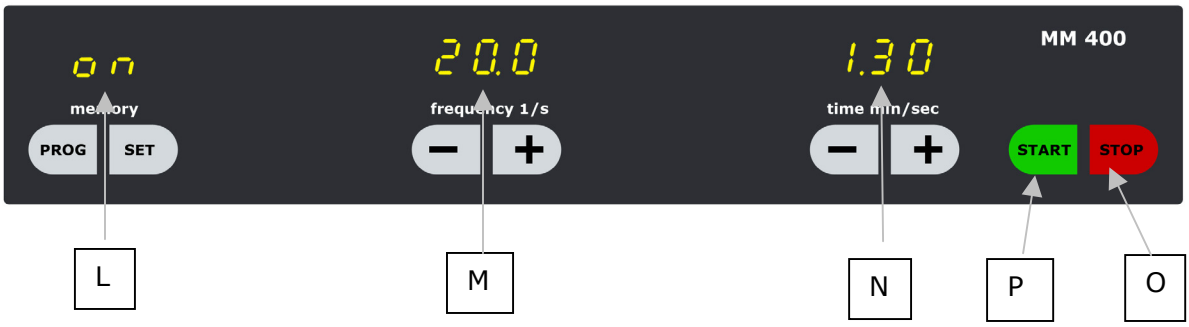


Rear view

General table

Element	Description	Function
A	Display and operating unit: for explanation see below	Time preselection, frequency preselection, programme and starting / stopping the machine
B	Hood	Closes the milling chamber
C	Milling cup holder - left	Holds the milling cup
D	Milling cup holder - right	Holds the milling cup
E	Switch ON / OFF	For switching the MM 400 on and off
F	Fuse compartment	Takes two visible type fuses
G	Machine socket	Connection for power cable of machine
H	Interface RS232	Enables operating software to be updated
I	Sign – Caution! unplug mains plug	Safety instruction
J	Type plate	Information on the machine and connected loads
K	Sign – Follow operating instructions	Safety instruction

Display and operating unit



Element	Description	Function
L	Memory , operating mode and stand-by	The various operating modes, such as on, programme and stand-by are displayed here.
	PROG	Calls the stored programmes
	SET	Stores the set milling parameters
M	Frequency display	The frequency can be set continuously from 3 to 30 Hz here.
	Frequency – minus button	In the on mode and in the operating mode: **Reduction of the set frequency by 0.1 oscillaltions. Continuous pressing switches on the digits fast running.**
	Frequency – plus button	In the setting mode and operating mode: **Increase of the set freuqency by 0.1 oscillations. Continuous pressing switches on the digits fast running.**
N	Time display	Shows the set milling time or, during operation, the milling time still remaining. Setting range: 10 seconds to 99 minutes.
	Time – minus button	In the on mode and operating mode: **Reduction of the set milling time by one second. Continuous pressing switches on the digits fast running.**
	Time – plus button	In the on mode and operating mode: **Increase of the set milling time by one second. Continuous pressing switches on the digits fast running.**
P	Start – button Green LED	Starts the milling operation Indicates milling operation
O	Stop – button Red LED and ON	Interrupts or ends the milling operation, Puts the machine into stand-by mode

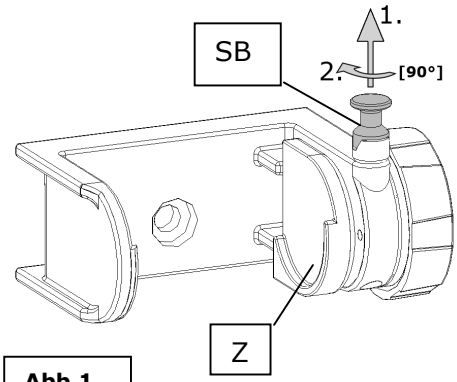


Abb.1

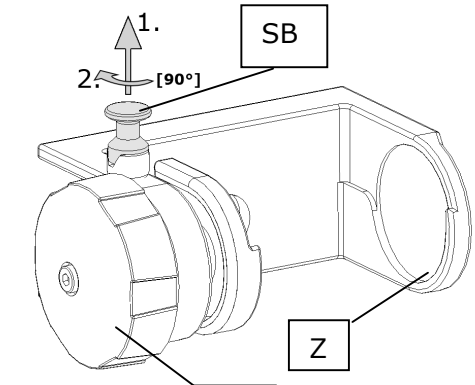


Abb.2

Inserting / replacing the milling cups

Place the milling cups, filled with the material to be milled and the milling balls, into the centering points **Z** of the clamping device and clamp firmly. **Fig.1/2**

- Remove the locking pin **SB** upwards from the groove and turn through 90°. **Fig.1/2**

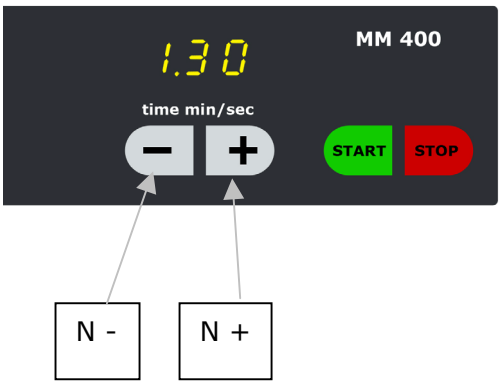
This unlocks the locking device.

- Turn the handwheel **HD** counterclockwise until the max. clamping range is reached. **Fig.1/2**
- Turn the locking pin **SB** back through 90° until it engages in the groove again.
- Insert milling cup and press lightly into the centering point **Z**
- Turn the handwheel **HD** clockwise with two fingers until the milling cup just fits, free of play, in the holder. Then continue to turn the handwheel clockwise through 8 – 12 easily audible "clicks", while at the same time the locking pin **SB** is raised and lowered with clearly audible "clicks".

The engaged locking pin reliably prevents automatic opening of the milling cup holder.
If the locking pin **SB** cannot be pulled upwards to release it, unlocking should not be forced with a hammer or similar tool.
Otherwise the hardened locking pin can break off.
Briefly retension the handwheel **HD** in the clockwise direction – the locking pin can then move freely again.

To remove the milling cup lift the locking pin and turn the handwheel in the opposite direction to tighten.

In order to guarantee quiet running of the MM 400 both milling positions must be loaded with approximately the same mass.
Ensure that the milling cups are inserted correctly in the guides. Otherwise the milling cup will be damaged when the machine is started.
When removing and opening hot milling cups always wear protective gloves. **Danger of burning the hands.**



Setting the milling time

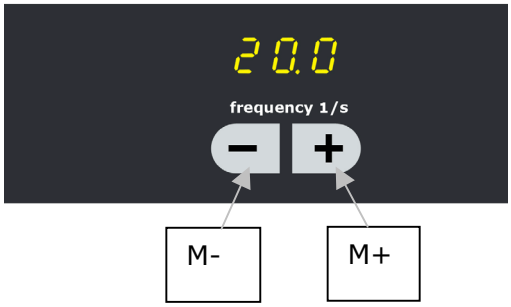
• Switch on the MM 400 with switch **D**

Preselect time:

- Set required milling time with + / - buttons **N+** and **N-**
- Short pressing of N+ or N- adjusts the time by one second or one minute. When pressed for longer the display runs continuously without a pause.

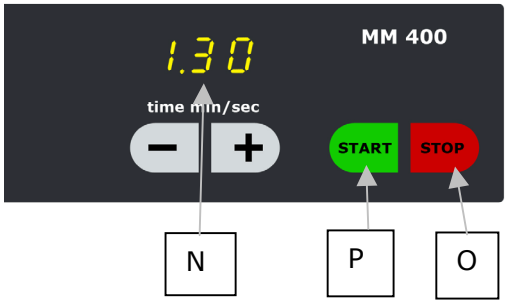
  If 99.0 minutes is exceeded the display **L** shows 0.10 seconds again.

Setting the frequency



- Set the frequency with + / - buttons **M+** and **M-.**
- Short pressing of + or – adjusts the frequency in single steps. With longer pressing the display runs faster. Selectable frequency range is from 3 to 30 Hz.

Starting the milling process



- Shut the hood.
- Set the frequency.
- Set the time.
- The milling operation is started with start button **P.**
- The milling time is recorded and the milling time still remaining is shown in display **N.**

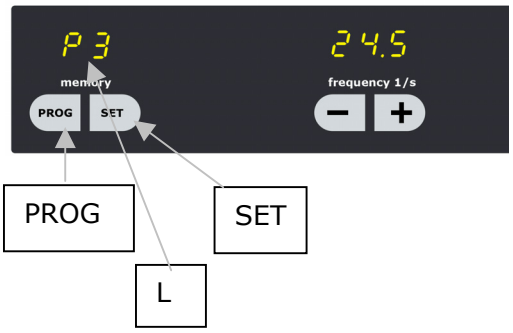
The milling process can be started only when the hood is closed.

Stopping the milling process

- Press the stop button **O.**
- Pressing once interrupts the milling process, for example in order to assess the milled material. The milling time still remaining is still visible in the display **N.** By repressing the start button the mill continues to run until the milling time has completely elapsed.
- Pressing the stop button twice stops the milling process. The machine is now in the stand-by mode.
- Pressing the start button reactivates the display and the milling time is reset to the last starting value.

During the milling process the time can be adjusted by pressing the **N+** or **N-** button.

When the milling time has elapsed the milling process is automatically ended. The display is reset to the last started value.



Storing the milling parameters

Storing or calling the preselected milling parameters can be carried out only in the **on** mode.

After switching on the **MM 400 "on"** appears in the display **L.**

By pressing the button **PROG** the next programme position **P1** to **P9** can be obtained. After programme position **P9 „on"** reappears in the display. In the **PROG** mode all buttons, apart from **PROG, START** and **STOP** are blocked.

- When the display shows **on**

  the frequency **M** and time **N** are freely adjustable.

- When the display shows **P1** to **P9**

  milling parameters can be stored and called

- **Start** = the milling process is started with the selected programme or the parameters freely selected under **„on"** .

Allocating the storage location

- Press button **PROG** once or several times until the required storage location **P1-P9** has been reached.
- Press **SET** button – all displays flash.
- Set frequency **M** and time **N.**

The programming mode can be discontinued by pressing the button **PROG** – the values are not stored.

- Press **SET** button – the values are stored.

Flashing of the display stops, the adjustment interlock is activated and the milling parameters are stored.

Operating hours display

If the buttons described below are pressed in the stand-by mode the complete running time of the machine is shown in hours and minutes.

Display operating hours :

- Press buttons **M+** and **SET** simultaneously and keep pressed.

  "bS" appears in the display **"memory".**

Leave operating hours :

- Press **STOP** button.

Operating software display

When the buttons described below are pressed in the stand-by mode the actual software version is displayed.

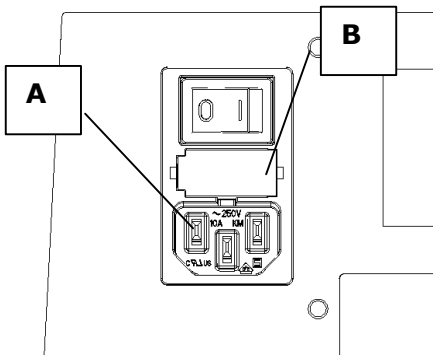
Display operating software:

- Press buttons **M-** and **SET** simultaneously and keep pressed.

  „S" appears in the display **„memory"** and the actual software version appears in the display **"frequency 1/s".**

Leave operating software display :

- Press **STOP** button.



Replacing the machine fuses

The following visible type fuses are required for the MM 400:

2 MT 3.15 A fuses

Replacing the fuses

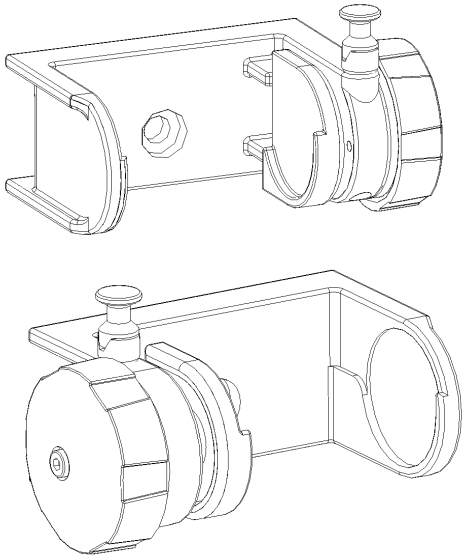
- Unplug mains plug from the machine socket **A**
- By pressing the locking devices on the side of the fuse compartment **B** these are released and can be pulled out.
- Replace fuses
- Insert fuse holder **B** so that it engages.

Working instructions

Target group: operators

General

The MM 400 is an ultramodern, high performance product from Retsch GmbH.
Owing to the large selection of accessories the oscillation mill, type MM 400, is a machine with many different application possibilities in laboratories in industry and research. It is used mainly in the chemical and pharmaceutical sectors and in mineralogical and biological applications etc.



The milling process

Clamp the machine filled with material to be milled, together with the milling ball/s in the milling cup holder as described.

- Close the hood.
- Set the milling parameters.
- Start the MM 400.

Do not open the hood during the milling process.

Although the milling cups are brought to a standstill immediately by the built-in brake, the millling process can no longer be continued with the remaining running time.

The MM 400 must be restarted and the initial parameters are then again available.

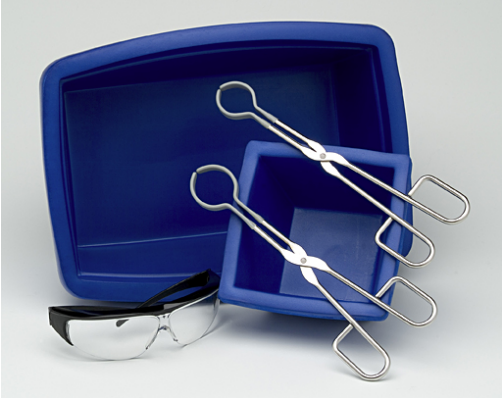
In order to guarantee quiet running of the MM 400 we recommend that milling cups with the same mass as far as possible are clamped in both milling positions.
Do not open the plexiglass hood during the milling process. Although the milling cups are brought to a standstill immediately by the built-in brake, the milling process can no longer be continued with the remaining running time. The MM 400 must be restarted and the initial parameters are then again available.

Quantities of milling material and grain sizes

Milling cup volume in ml	Milling material quantity in ml min – max	Ball filling optional Number	dia. in mm	max. charging grain size in mm
25	4 – 10	1	15	6
35	6 – 15	1	20	6
50	8 – 20	1	25	8

Milling of materials which can cause a fire or explosion in the MM 400 is prohibited.
Please take any necessary measures to prevent danger to persons, depending on the dangerous nature of your sample.
Please note that the properties, and therefore the dangerous nature of your sample, can change during the milling process.

Safety instructions for handling liquid nitrogen



The MM 400 is also designed for cryogenic milling.

As an accessory for cold milling we also supply a cryo kit for cooling the milling cups with liquid nitrogen.

Cryo kit order number: 22.354.0001.

When handling liquid nitrogen always wear protective goggles and protective gloves.

Liquid nitrogen has a temperature of – 196°C and can cause injury similar to burns or frostbite in contact with the skin or eyes.

Protective goggles also protect the eyes against serious injuries through flying glass splinters, which may be caused through bursting of glass containers as a result of low temperature tension.

Please follow the safety regulations of the cooling liquid supplier.

Retsch GmbH excludes any liability claims whatsoever which may arise through the use of liquid nitrogen or similar materials.

Safety functions and fault displays

Safety functions

F01

F01 - Overloading

In order to avoid overloading of the drive motor and resulting endangerment to the user the MM 400 is fitted with a load monitoring device.

In case of overloading the monitoring function switches the machine off in good time and allows the necessary cooling time. The user recognises this by an alternating flashing display F01 and an indication of the remaining cooling time, e.g. 0.3, = 3 minutes.

At the end of the cooling time it is only necessary to switch the machine off and on again in order to be able to operate it normally again.

F02

F02 – Speed recognition, zero speed

If the drive does not start up after pressing the start button there is a fault in the system. Possible causes: drive blocked, motor or speed sensor defective.

F03

F03 – Speed recognition, overspeed

If the specified frequency is exceeded after starting, „F3" appears in the display and the machine is switched off.
Possible cause of fault: defective speed sensor.

F04

F04 – Hood open

The drive must not run when the hood is open. This serves to protect the operator against injury. If the hood is opened when the machine is running the control unit switches the drive off immediately and "F04" appears in the display. If the start button is pressed with the hood open in order to start the milling process "F04" is also displayed and the drive is not started.

This alarm can be cancelled by pressing the stop button.

F05

F05 –Keyboard monitor

If one or more buttons are pressed for longer than 15 seconds the control unit switches the drive off and displays "F05".

This function is intended to prevent unintentional faulty operation if any object accidentally presses on the keyboard.

In order to cancel this fault alarm switch the machine off and on again once.

F06

F06 – Magnetic speed monitoring sensor

If one of the magnets that monitors speed is missing or defective, this will be detected by the control, which will then switch off the machine. "F06" will appear in the display. To eliminate this fault, it must be repaired by authorised Retsch service technicians.

F07

F07 – Magnetic switch – hood monitoring

If the magnetic switch which monitors hood opening has a defect in the supply line this is recognised by the control unit and causes the machine to be switched off. "F07" appears in the display. To eliminate this fault repair by an authorised Retsch service agent is necessary.

General

Cleaning

Do not clean the MM 400 with running water.

Danger to life through current surge

Use only a cloth moistened with water. Cleaning agents and solvents must not be used – not for cleaning the milling tools either.

Maintenance

The MM 400 is maintenance-free. When used properly no maintenance and setting work need be carried out.

Do not make any alterations to the machine and use only spare parts and accessories approved by Retsch.

Otherwise the declared conformity with the European directives by Retsch will lose its validity. Furthermore this will lead to loss of any kind of guarantee claims.

Wear

The milling tools can become worn, depending on the frequency of the milling operation and the material to be milled. The milling cups and ball(s) should be regularly checked for wear and replaced if necessary.

Wearing parts

These operating instructions do not include instructions for repair. For your own safety repairs should be carried out only by Retsch GmbH or an authorised representative (service technicians).

Checks

Correct functioning of the hood switch must be checked regularly:

- Switch on the machine with switch **E.**
- Start milling operation with start button **P.**
- Lift the hood.
- If there is an opening gap of a few cm the machine is switched off and **F4** appears in the display.
- Cancel **F4** with stop button **O.**

If this switching off function does not take place the MM 400 must be checked immediately by Retsch service.

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Anyone violating is liable to pay damages.

Alterations
Subject to technical alterations without notice.

Accessories for MM 400

Designation	Material	Article no.
Milling cup 25 ml	Hardened steel	01.462.0237
Milling cup 1.5 ml	Stainless steel	01.462.0230
Milling cup 5 ml		01.462.0231
Milling cup 10 ml		01.462.0236
Milling cup 25 ml		02.462.0213
Milling cup 35 ml		01.462.0214
Milling cup 50 ml		01.462.0216
Milling cup 10 ml	Tungsten carbide	01.462.0235
Milling cup 25 ml		01.462.0217
Milling cup 5 ml	Agate	01.462.0232
Milling cup 10 ml		01.462.0233
Milling cup 10 ml	Zirconium oxide	01.462.0234
Milling cup 25 ml		02.462.0201
Milling cup 35 ml		01.462.0215
Milling cup 25 ml	Teflon	01.462.0238
Milling cup 35 ml		01.462.0244
Milling balls dia. 5,7,9,12,15 mm	Hardened steel	
Milling balls dia. 5,7,9,12,20,25 mm	Stainless steel	
Milling balls dia. 5,7,9,12,15 mm	Tungsten carbide	
Milling balls dia. 5,7,9,12 mm	Agate	
Milling balls dia. 12,15,20 mm	Zirconium oxide	
Milling balls dia. 10,12,20 mm	Teflon with steel core	
Milling balls dia. 5,7,9,12 mm	Polyamide for mixed vessels	

Further accessories are given in our price list or in internet under www.retsch.de

Safety regulations for the MM 400 - summary

Subject	Action	Danger
Safety	Danger to persons and damage to the equipment caused through non-observance of the safety instructions	Claims for damages in any form are excluded
Transport	Do not knock, shake or throw the MM 400 during transport	Electronic and mechanical components can be damaged
	Keep the packing material for the duration of the guarantee period	Complaint and return of the goods in inadequate packing puts your guarantee claim at risk
Temperature variations	Protect the MM 400 from condensed water if there are temperature variations	Electronic components can be damaged
Supply schedule	If the delivery is incomplete and / or there is transport damage you must inform the transporter and Retsch GmbH immediately (within 24 hrs).	Later complaints may possibly no longer be considered.
Ambient temperature	Temperature drops below 5°C Temperature exceeds 40°C	Electronic and mechanical components can be damaged. Performance data are changed to an unknown extent.
Atmospheric humidity	Exceeds 80% at temperatures up to 31°C	Electronic and mechanical components can be damaged. Performance data are changed to an unknown extent.
Electrical connection	Mains power supply does not agree with values on type plate Fault-current circuit breaker must be incorporated into the power supply.	Mechanical and electronic components can be damaged. Prevents electric shock if machine has an electrical defect.
Inserting milling cups	Ensure that the milling cups are positioned correctly in the guides.	Milling cups and holder can be damaged.
Checks	Check hood switch regularly	Danger of injury if defective and machine open during operation.
Cleaning	Do not clean with running water	**Danger to life through current surge**

Warranty Conditions

1. If legitimate claims are made we shall remedy the defect or replace the goods free of charge.

   The purchaser shall only have a right to rescind the contract or reduce the purchase price if we have decided that it is not possible to remedy the defect and a replacement delivery cannot be made or the time limit therefore cannot be complied with or if a reasonable additional time limit of six weeks granted by the customer has not been complied with due to our fault.

   If the remedy or replacement delivery in fact fails the customer shall have the right to reduce the price or rescind the contract at his discretion. Further claims, in particular for damages in relation to damage not caused to the goods themselves, such as lost production, are excluded in so far as we have not acted wilfully or negligently. For goods produced by third parties we pass on the liability of the manufacturer.

2. We shall bear the costs directly incurred through the remedying of defects or the replacement delivery on the condition that claim is found to be legitimite. This also applies to the freight costs as well as the reasonable costs of removal and installation. The customer, however, undertakes to bear the reasonable costs of providing his own technicians and assistants on site.

   If our customer carries on business overseas, however, we shall be entitled to pay the costs, in particular costs of transport, tolls, wages and materials, ex German border.

3. The warranty term for newly manufactured goods is two years, for used it is one year.

   The guarantee refers to deployment in a laboratory in 1-shift operation. In case of multi-shift operation or other areas of application, the guarantee term is shortened accordingly.

   No warranty is given for parts subject to wear and tear.

4. We warrant that our goods are free from manufacturing defects. The suitability, classification and function of our goods are determined exclusively on the basis of the performance descriptions contained in the order confirmation even if these differ from the order. In the latter event the customer may, within two weeks after receipt of the order confirmation, draw any possible difference from the order to our attention and come to an agreement on these with us. If the customer does not object to the specifications in the order confirmation then these shall be deemed to have been accepted.

   Unless an agreement to the contrary has been reached, we shall not be held liable for the suitability of the goods delivered for the use to which the customer intends to put them. The same applies to performance figures expected by the customer unless we have been able to carry out appropriate preliminary practical experiments and have, in our order confirmation, declared in writing that these performance figures shall be binding.

5. Our warranty shall also become invalid if persons other than those employed by us carry out repairs or in any other way interfere with or make alterations to the goods delivered by us or do not use suitable parts to the extent that the defect is causally connected thereto. In addition, it is a condition of our warranty that our directions for use and operation be followed.

6. If, without a release having first been obtained from us, the goods are installed in and /or connected to, attached to or incorporated in other systems or production plants then our guarantee is limited exclusively to the parts delivered by us.

7. The remedying of defects or replacement of defective parts shall, at our discretion, be carried out on site or at the seat of our company. If the repair is carried out on site, the customer shall ensure that our employee has access, unlimited in either time or space, to the purchased item. In addition, the customer may only demand that work necessary in order to fulfil warranty obligations be carried out during the normal local business hours. If such work is carried out outside our normal business hours on request, the customer shall bear the additional costs. If he wishes to have other particular work performed which goes beyond the work warranted then these costs shall be payable at the actual valid price.